Rejection of claims 14, 16, 17, 25-29 and 37-39 under 35 U.S.C. §112

Claims 14, 16, 17, 25-29 and 37-39 have been rejected under 35 U.S.C. §112, second paragraph, as being indefinite. In particular, the Office Action indicates that "it is not clear what the Applicant means 'that' as recited in independent claim 14, line 13."

As suggested in the Office Action, claim 14 has been amended to recite "a card reader positioned within the housing, the card reader operating at least at 15 MHz and receiving video input ... card reader." Thus, the rejection of claim 14, as well as the other claims that depend from claim 14, under 35 U.S.C. §112, is overcome.

Reconsideration of the rejection under 35 U.S.C. §112 is respectfully requested.

Rejections under 35 U.S.C. §103(a)

Claims 14, 25-27 and 37-39 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Novis et al. (US 5,867,795) in view of Stewart et al. (US 5,337,068) and Kitazima et al. (US 4,532,506). Claims 16, 17 and 28 have been also rejected under 35 U.S.C. §103(a) based on Novis in view of Stewart and Kitazima, and further in view of Ohtsuki et al. (US 5,786,665). Claim 29 has been rejected under 35 U.S.C. §103(a) based on Novis in view of Stewart and Kitazima and Ohtsuki, and further in view of Zavracky et al. (US 5,206,749).

In the Response to Arguments section, the Office Action states that the feature upon which applicants rely, a timing circuit, is not recited in the rejected claims.

Contrary to the statement in the Office Action, independent claim 14 does recite an active matrix liquid display having a display control circuit that includes "a timing circuit that determines when the display control circuit actuates the pixel electrodes to present an image, and flashes the light source to illuminate the image."

As explained in the previous amendment and illustrated in Figure 12A, the Applicants' display system includes a switching circuit (1133) that is under the direction of a timing circuit (1122). A common voltage (V_{com}) enters a counterelectrode panel of a display (1112) at alternating values controlled by the switching circuit (1133). In addition, a processor (1104) receives image data at an input (1121), and sends display data to memory (1124) and flash memory (1125) via the timing circuit (1122). The image data also travels from the timing circuit (1122) to an array of pixel electrodes of the display (1112). Furthermore, the timing control

circuit (1122) receives clock and digital control signals from the processor (1104) and transmits control signals to a backlight (1111), which is a light source for illuminating images presented on the display.

In operation, with the common voltage set to (V_{com})high, an actual video signal is scanned into the pixel electrodes of the display (1112), and the backlight (1111) is flashed to present the image on the display. Driving the common voltage to (V_{com})low erases the image. However, the backlight (1111) is not on at that time, and therefore the loss of the image is not seen. With the common voltage now set at (V_{com})low, an inverted video signal is scanned into the pixel electrodes, and then, after a delay, the backlight (1111) is flashed again to present the refreshed image or new image. Driving the common voltage to (V_{com})high erases the image that has just be scanned into the pixel electrodes. The timing circuit (1133) determines when the image is presented on the display, and when the setting of the common voltage applied to the counterelectrode is switched to erase the image.

In contrast, Novis discusses, as illustrated in its Figures 5 and 6, a portable electronic device including a virtual image display positioned within a housing or a remote unit. Novis's display (40) includes an apparatus (41) that provides an image on a surface (42). A lens (44) is positioned in space relation to the surface (42) and produces a virtual image that is viewable by an eye (46) from an aperture (45) defined by the lens (44). The apparatus (41) includes a light emitting device (LED) array (47) driven by data processing circuits (48). Novis's data processing circuits (48) include, for example, logic and switching circuit arrays for controlling each LED in the LED array (47). Additionally or alternatively, the data processing circuits (48) include a microprocessor for processing input signals of software instructions to produce a desired image on the LED array (47). Novis states at column 7, lines 7-12 that other image generating devices instead of LEDs may be utilized, including liquid crystal devices.

Novis's display circuit, however, does not include the Applicants' switch (1133) that selects a common voltage applied to the liquid crystal display, as recited in amended independent Claim 14, or more particularly, that selects a common high or low voltage applied to a counterelectrode panel of the liquid crystal display, as stated in new dependent claims 37-39.

Therefore, without a switching circuit that switches a common applied voltage to a liquid crystal display, Novis's display system cannot include the claimed timing circuit that determines

when the display control circuit actuates the pixel electrodes to present an image, and flashes the light source to illuminate the image, and when the switching circuit switches the common voltage applied to the liquid crystal display to erase the image, as required by amended claim 14.

The Office Action cites Stewart as teaching an active matrix color sequential LCD. In addition, the Office Action indicates that a timing circuitry (10) and a commutator (112) of Stewart correspond to the claimed timing circuit.

Stewart discusses, as illustrated in its Figures 1 and 2A, a backlit field sequential color display system including a display panel (114), a scanner circuitry (106), a timing circuitry, a commutator (112), and a plurality of colored lamps (202-218). The timing circuitry (110) controls the scanner circuitry (106) to scan the images onto the LCD matrix, and the commutation circuitry (112) to activate the lamps (202-218) in synchronism with the scanning of the LCD matrix. In operation, the red lamps (202, 208, 214) are flashed in sequence responsive to commutation circuitry (112) as the red video information is scanned onto the LCD display panel (114), the green lamps (204, 210, 216) are flashed in sequence as the green information is displayed, and then the blue lamps (206, 212, 218) are flashed in sequence as the blue information is displayed.

Although Stewart discusses a timing circuitry controlling a scanner for scanning images and a commutator for activating colored lamps, Stewart fails to suggest a timing circuit that determines when a "switching circuit switches the common voltage applied to the liquid crystal display to erase the image," as recited in amended claim 14. Stewart is merely concerned with sequentially forming separate red, green and blue images synchronous with the illumination of the respective red, green and blue lamps. In fact, there is no mention of using the timing circuitry and the commutator to switch the common voltage applied to the liquid crystal display to erase the image. Thus, the timing circuitry and commutator of Stewart does not correspond to the claimed timing circuit.

More importantly, Stewart is unrelated to portable devices. Stewart discusses a large (8x12 inch) LCD panel illuminated by 24 red, green, and blue lamps. Each lamp has a diameter of 7mm and extend 2-4 cm past the ends of the display panel. Each lamp is therefore at least 14 inches long. Such a device would not be portable, and one of ordinary skill in the art would not look to Stewart to solve a problem with portable display devices. Even if one skilled in the art

knew about Stewart, its teachings would be of no benefit to a portable system. In combining Stewart, the Office Action is using improper hindsight based on the claimed invention.

The Office Action cites Kitazima as teaching a switching circuit. In particular, the Office Action indicates that a counter electrode terminal voltage receiver (44) corresponds to the claimed switching circuit.

Kitazima discusses, as illustrated in its Figure 3, a display element (10) having a first semiconductor switch (13), a second semiconductor switch (14), a capacitor (15), and a picture cell (16). The picture cell (16) is formed by a space defined by a first electrode (24) and a common electrode (20) and liquid crystal held in the space. The first and second switches and the capacitor are arranged so that the capacitor (15) may be of smaller capacitance than the prior art storage capacitor and thus occupying a smaller area. In addition, the terminals of the first and second switches are connected in common to a gate signal line so that the wiring of the signal line is simplified.

Kitazima also fails to suggest a switching circuit "that switches a common voltage applied to the liquid crystal display to erase the image," as recited in amended claim 14. Kitazima is merely concerned with reducing the number of wires and simplifying a drive circuit by allowing a mixture of the excitation voltage of the display medium and the scan voltage.[1] That is, Kitazima allows the switches to turn a picture cell on or off in a wide range of source and gate voltages. However, Kitazima is not concerned with switching a common voltage. In fact, there is no discussion at all in Kitazima of switching a common voltage applied to the liquid crystal display to erase the image. Thus, the counter electrode terminal voltage receiver of Kitazima does not correspond to the claimed switching circuit.

As for the secondary references, the Office Actions cites Ohtsuki as teaching a LCD device with an LED device, Michel as teaching a LCD device with an LED for illuminating an array of pixel electrodes, and Zavracky as teaching a LCD display panel with an array of transistor circuits formed on a single crystal silicon and bonded to an optically transmissive substrate with an adhesive layer. However, none of these references teaches or suggests the Applicants' switching circuit under the direction of a timing circuit that switches a common

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[1]See col. 6, lns. 4-8.

voltage applied to a liquid crystal display. Hence, none of these secondary references overcomes the deficiencies of Novis, Stewart, and Kitazima for at least the reasons stated above.

Novis, Stewart, and Kitazima alone, or when properly combined, do not make obvious the invention described in amended claim 14. Therefore the rejection of claim 14 is overcome. Further, because none of the secondary references overcomes the deficiencies of Novis, Stewart, and Kitazima and because the other claims depend from amended claim 14, the reasons for allowance of claim 14 apply as well to the dependent claims.

Reconsideration of the rejections under 35 U.S.C. § 103(a) is respectfully requested.

CONCLUSION

In view of the above amendments and remarks, it is believed that all claims are in condition for allowance, and it is respectfully requested that the application be passed to issue. If the Examiner feels that a telephone conference would expedite prosecution of this case, the Examiner is invited to call the undersigned attorney at (978) 341-0036.

Respectfully submitted,

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Dated: March 24, 2003

MARKED UP VERSION OF AMENDMENTS

Claim Amendments Under 37 C.F.R. § 1.121(c)(1)(ii)

14. (Four Times Amended) A portable display system comprising:

a housing;

an active matrix liquid crystal display mounted to the housing, the liquid crystal display including an array of pixel electrodes, a display control circuit that actuates the pixel electrodes to present an image on the display, and a light source that illuminates the image and is connected to the display control circuit, the display control circuit including a switching circuit that switches a common voltage applied to the liquid crystal display, and a timing circuit that determines when the display control circuit actuates the pixel electrodes to present an image, and flashes the light source to illuminate the image, and when the switching circuit switches the common voltage applied to the liquid crystal display to erase the image;

a lens that magnifies the image on the display; and

a card reader positioned within the housing, the card reader operating [and that operates] at least at 15 MHz and receiving [receives] video input to be presented on the display from a card that docks with the card reader.